

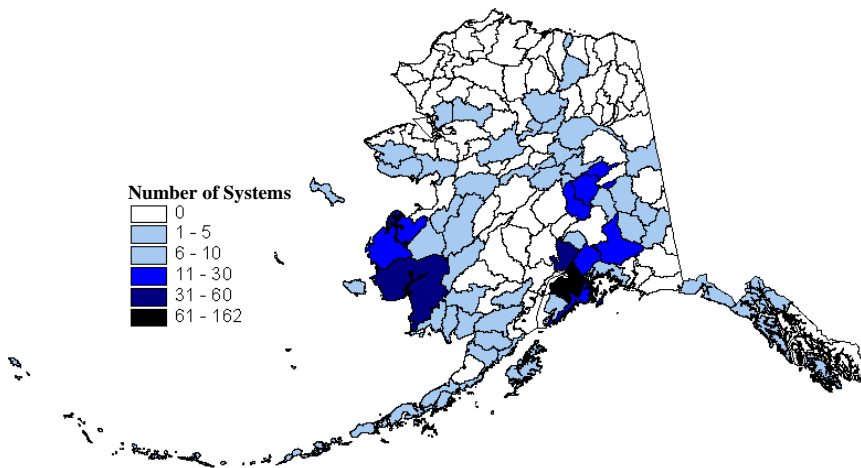
## GROUNDWATER IN ALASKA

**Groundwater Importance:** Alaska's groundwater resources may be among the greatest in the nation. However, very few of Alaska's aquifers have been characterized (or even located) and little water quality data is available.

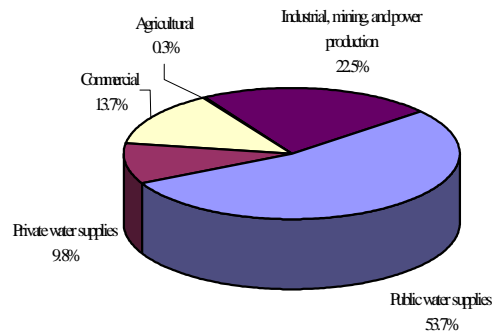
Alaska is sparsely populated by approximately 640,000 residents (approximately one resident per square mile). Urban development is concentrated in a few main population centers, with the majority of people living in southcentral Alaska. Nearly one-half of the state's population lives in the Municipality of Anchorage. Other major population centers include Fairbanks in the state's 'interior' and Juneau, the state capital, in southeast Alaska. Beyond these major population centers, communities tend to be small and generally not connected by roads.

Groundwater is a source of drinking water for about 50 percent of Alaska's population, and 90 percent of the state's rural residents. Eighty-seven percent of Alaska's 3,500 public drinking water systems are groundwater-supplied. A small number of public water systems (e.g., Anchorage and several southeastern communities) serve a large number of people from surface water sources. Ninety percent of private drinking water supplies are groundwater. Of the 275 million gallons of water used each day for domestic, commercial, industrial, and agricultural purposes in Alaska, roughly 23 percent is derived from aquifers.

**Distribution of community & nontransient/noncommunity public water systems in Alaska using groundwater**



**Groundwater withdrawals in Alaska during 1999  
63 MGD**



**Where is it?** Groundwater is available in most areas of Alaska, except where permafrost is very deep in the northern part of the state. Southcentral and interior Alaska have the greatest dependence on groundwater. Arctic, western, and southeastern Alaska make more frequent use of streams, rivers, lakes, and rainwater catchments. The largest groundwater withdrawals occur in the Anchorage and Fairbanks areas, and the Matanuska-Susitna and Kenai Peninsula Boroughs in the southcentral portion of the state.

Most of Alaska's aquifers consist of unconsolidated materials derived from glaciers, rivers, and streams. Producing aquifers are typically unconfined (i.e., not protected by a layer of clay or silt). The depth to groundwater ranges from a few feet to over 400 feet statewide.

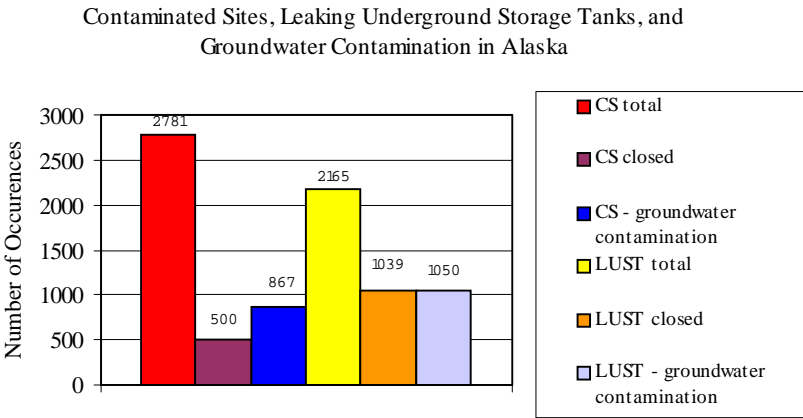
**How good is the water?** Groundwater quality is generally good in Alaska, although water quality data is sparse. Most of the state's groundwater is suitable for domestic, agriculture, aquaculture, commercial, and industrial uses with moderate or minimal treatment. However, fuel storage and wastewater disposal are common threats to groundwater quality statewide. And a range of other activities either have, or have the potential to, affect groundwater quality (e.g., nonpoint pollution in urban areas, natural resource extraction activities in remote locations, and a wide range of potential point sources of pollution). Approximately 2,165 leaking underground storage tanks have been identified so far, roughly 50 percent of which may affect groundwater quality. Another 2,781 contaminated sites have been identified, including seven Superfund sites and 13 RCRA-permitted sites where clean-ups are currently under way.

**Cost of Contamination:** The cost of remediating contaminated groundwater can be staggering. US EPA estimates that the average cost to remediate a Superfund (the Comprehensive Environmental Responses Compensation and Liability Act of 1980) or RCRA (Resource Conservation and Recovery Act) site ranges from 1 to 3 million dollars. In addition to clean-ups

at CERCLA and RCRA sites, numerous underground storage tanks have been removed in Alaska, particularly in the last year. Of the remaining 2,781 contaminated sites identified, about 867 pose a threat to groundwater. Of those, only 150 have been cleaned-up to date. Estimates of the present and potential costs of contaminating Alaska’s groundwater have not been compiled.

**Efforts to Protect Groundwater:** Protection of Alaska’s groundwater is largely accomplished through the regulation of contaminated sites, storage tanks, spill response, and specific waste disposal activities under state and federal programs at this time. The Alaska Department of Environmental Conservation (ADEC) manages several programs that contribute to the protection of groundwater, including ADEC’s Contaminated Sites, Storage Tank, Prevention & Emergency Response, Industry Preparedness & Pipeline, Solid Waste, Pesticides, Water & Wastewater, Watershed Development, Water Quality Protection, and Community Assistance & Information Programs. US EPA’s Underground Injection Control Program, and a number of other important EPA programs, can also have a significant impact on groundwater quality in Alaska.

ADEC has implemented a new program to facilitate and promote community-based efforts to protect groundwater serving as a source of public drinking water in Alaska. Under ADEC’s Drinking Water Protection Program (a combination of ‘source water assessment’ and ‘wellhead protection’ programs required under the Safe Drinking Water Act), public water systems, community governments, and the general public will be provided with information they can use through local initiatives to preserve the quality of public drinking water supplies, including groundwater drawn from aquifers, in nearly every populated area of the state.



During the next two years, the Drinking Water Protection Program will establish ‘protection areas’ and ‘vulnerability assessments’ will be completed for Alaska’s 700 largest public water supplies (serving communities, schools, and other nontransient populations). Drinking water protection areas will also be established for another 1000 smaller public drinking water supplies (serving lodges, restaurants, and other places that people visit) as a basis for voluntary local protection efforts. Vulnerability assessments for public water supplies will include the construction of aquifer susceptibility maps for basins or sub-basins representing most of the populated areas of the state.

**Next Steps:** Vulnerability assessments for groundwater (and surface waters) serving as sources of public drinking water will require periodic updating if they are to keep pace with development and serve as an ongoing basis for community-based groundwater protection efforts. It is estimated that assessments will be updated every five years.

Vulnerability assessments for public water supplies can serve as a foundation or ‘stepping stone’ to comprehensive management and protection of Alaska’s groundwater resources, including future domestic water supplies and water needed to support commercial and industrial growth. Information gathered and generated during the initial years of the assessment program for public water supplies can be used in the future to enhance the protection of lakes, rivers, and streams in populated areas by validating or improving on ‘total maximum daily loads’ (TMDLs) used to issue permits to discharge wastes. They can also help establish TMDLs to manage the discharge of wastes to aquifers; identify critical ‘sole source’ aquifers; identify any areas of declining groundwater levels; and perform ‘unified watershed assessments’ statewide. Long-term sustained funding and staff will be needed to take these ‘next steps’.